

## TAXONOMIC STUDY OF THE GENUS *SYNEDRELLA* (ASTERACEAE, HELIANTHEAE)

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### ABSTRACT

A taxonomic study of the monotypic genus *Synedrella* is rendered. It is represented by a single, highly variable, weedy species, *S. nodiflora*. Originally native to the New World tropics, it is now widely distributed in the tropical regions of the Old World and various island in between. An account is given of its taxonomic history, chromosome numbers, generic position, and worldwide distribution, including maps.

KEY WORDS: Asteraceae, Heliantheae, *Synedrella*, tropical weed

The genus *Synedrella* was established in 1791 by Gaertner, based upon *Verbesina nodiflora* L., which is typified by material collected in the West Indies (Jamaica) by Browne (Adams 1972; Howard 1989). According to most workers it is native to tropical America (perhaps the Caribbean Islands) but is now pantropical in distribution.

Some authors (e.g., Adams 1972) have noted that the genus contains two species because of a second named taxon, *Synedrella peduncularis* Benth. from Ecuador, the latter transferred to the genus *Schizoptera* Turez. in 1916 by Blake, where it is properly positioned.

Because of its weedy nature and pantropical distribution, *Synedrella nodiflora* (L.) Gaertn. is accounted for in numerous regional or local floras. Nevertheless, to my knowledge, infraspecific taxa within the species have not been proposed, nor would I suggest that such exist, there being considerable variation of nearly all characters, both within and between populations.

## CHROMOSOME NUMBERS

There have been over 20 published articles in which chromosome counts for *Synedrella* are reported (cf. standard indices through 1989). It was first counted by Banerji & Pal (1959) as diploid with  $2n = 40$ . Most subsequent workers have corroborated this number, except for a few workers who report counts of  $2n = 32$  (1 count),  $2n = 36$  (2 counts), and  $2n = 38$  (2 counts). Nirmala & Rao (1981, 1986) have reported the most recent anomalous counts for *Synedrella* ( $2n = 36$  and  $38$ , respectively), both counts from populations in India. Other workers, however, have reported yet other Indian populations as  $2n = 40$ . In summary, the preponderance of counts suggest that the prevalent number in *Synedrella* is  $2n = 40$ , suggesting an ancestral base number of  $x = 10$ .

## GENERIC RELATIONSHIPS

*Synedrella* belongs to the tribe Heliantheae where it relates to a group of genera centering about the large pantropical genus *Wedelia*. Both Stuessy (1977) and Robinson (1981) positioned *Synedrella* in the subtribe Ecliptinae, the latter taxon mostly characterized by their compressed, often winged, carbonized achenes; disk florets mostly hermaphroditic, having blackened anther thecae, and corollas with well-defined fiber sheaths. As treated by Robinson (1981) the subtribe contains 65 or more genera. Amongst these *Synedrella* seems closest to the poorly known South American genus *Synedrellopsis* Hieron. & Kuntze, with which it might comfortably be combined; at least I can find no significant characters to distinguish between them (the achenes of both *Synedrella* and *Synedrellopsis* are pictured in Robinson [1981]). Aside from *Synedrellopsis*, *Synedrella* appears closely related to *Calyplocarpus* Less. (cf. McVaugh & Smith 1967). According to restriction site analysis of chloroplast DNA (Kim, K.-J., unpubl.), *Calyplocarpus* is clearly related to the genus *Lasianthea*, a largely Mexican genus of the subtribe Ecliptinae.

*SYNEDRELLA* Gaertn., nom. cons.

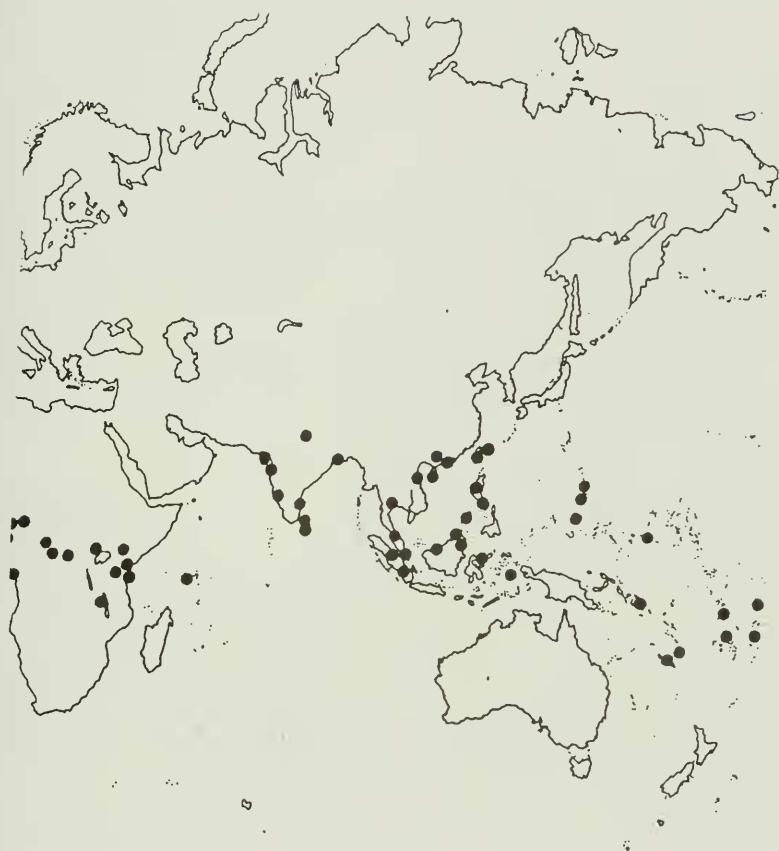
Erect tap-rooted herbs. Leaves simple, opposite. Heads arranged 2-10 to a node, sessile or rarely pedunculate. Involucral bracts 2, herbaceous, tubes slender, as long or longer than the ligules; style branches slender and filiform with acute apices. Disk florets 4-merous; anther appendages plicate, wider than long; style branches linear-lanceolate, gradually acuminate. Achenes heterocarpic, those of the ray tangentially flattened with stiff erose margins and erect pappus scales, those of the disk oblanceolate to clavate and somewhat



Figure 1. North American distribution of *Synedrella nodiflora*.



Figure 2. World distribution of *Synedrella nodiflora*.



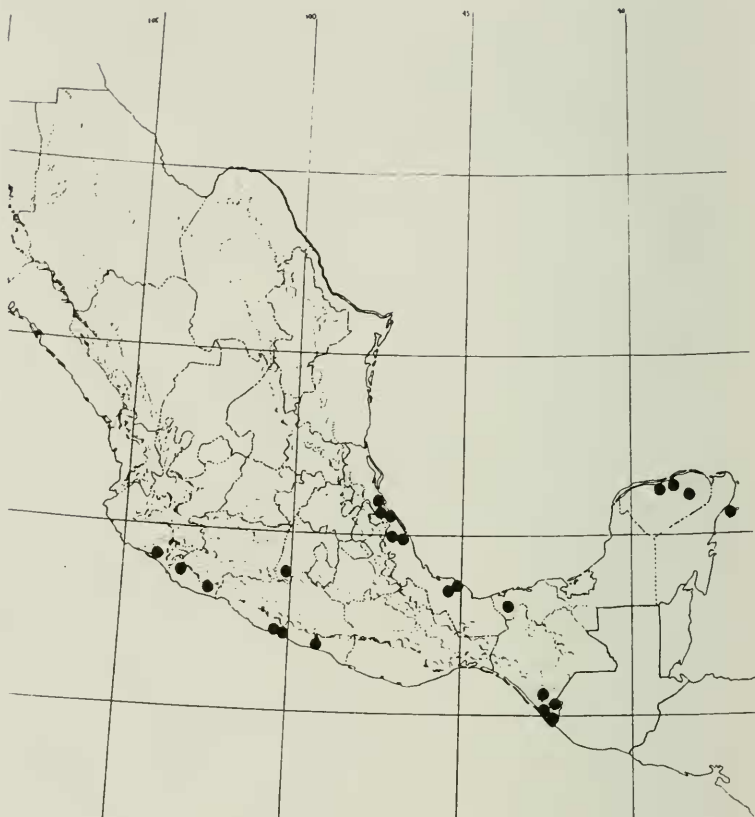


Figure 3. Mexican distribution of *Synedrella nodiflora*.

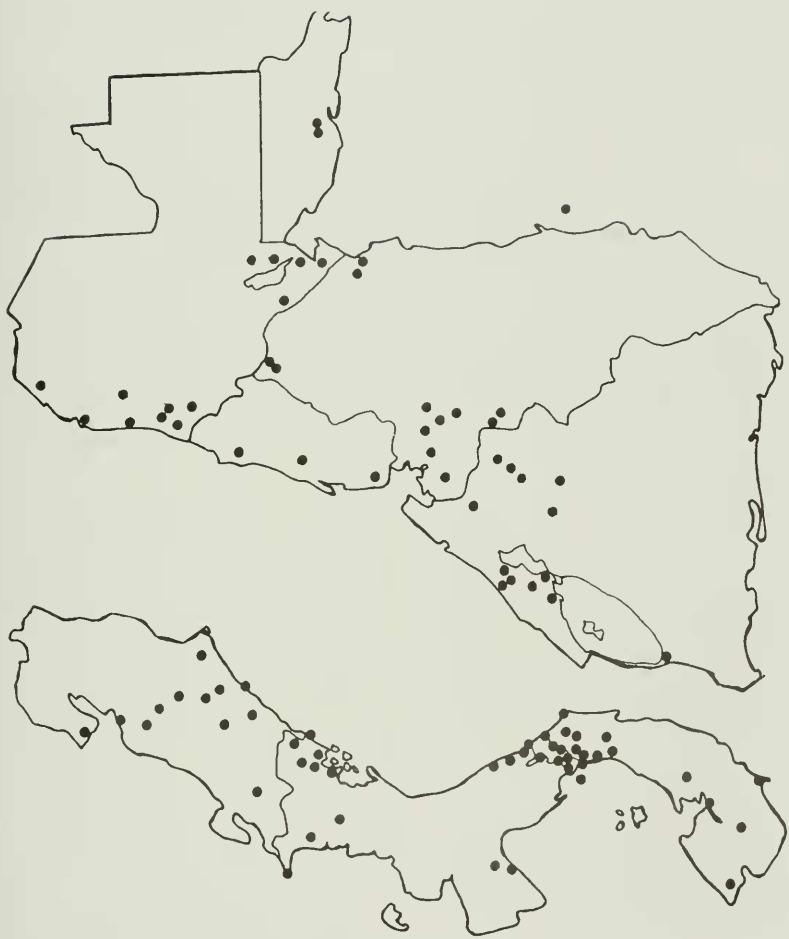


Figure 4. Central American distribution of *Synedrella nodiflora* (Guatemala to Panamá).

4-sided, tangentially compressed, the pappus of 2-3 stiff divaricate awns. Base chromosome number,  $x = 20$ .

*Synedrella nodiflora* (L.) Gaertn., *Fruct.* 2:456. pl. 171. 1791. BASIONYM: *Verbesina nodiflora* L., *Cent. Pl.* 1:28. 1755. *Ucacou nodiflorum* (L.) Hitchc., *Rep. Missouri Bot. Gard.* 4:100. 1893. According to Adams (1972), this name is typified by material collected in Jamaica by Browne. The illustration accompanying the original description and that of Adams (1972) leaves little doubt as to its correct application.

Since the genus is monotypic the generic description provided here, as well as McVaugh's excellent description and illustrations (1984) suffice to circumscribe the species. As would be anticipated in a pantropical weedy species (Figure 2) the taxon is exceedingly variable as to habit, foliage shape, and vestiture, but the floral characters are remarkable uniform throughout its range, except that the achenes are quite variable, especially as regards shape and degree of surface ornamentation of the disk achenes, these varying from tangentially flattened and without corky enations, to subquadrate and markedly corky, the 2-3 awns of the pappus varying from either stiffly erect to widely divergent.

DISTRIBUTION - *Synedrella nodiflora*, as already noted, is a pantropical weed. It is likely that it was originally native to tropical America and subsequently distributed elsewhere by modern man. The species is largely restricted to lowland regions from sea level to ca. 500 meters and is clearly weedy, most often found in disturbed habits, usually fallow fields. It flowers in all seasons, depending on rains and should be readily disseminated considering its small readily detached achenes with their lateral hooking devices.

Because the plant is abundant in herbaria, and the fact that only a simple clearcut species is involved, I will let the distributional maps (Figures 1-4) document its occurrence as determined from sheets personally examined. I do provide below a brief listing of selected collections showing the location of appropriate voucher material and the earliest date of collection (shown in parentheses) within a region.

## NORTH AMERICA

UNITED STATES. Hawaii: Honolulu, *Degener* 18308, NY (1925). Florida: Apalachicola, *Chapman* 6095, MO (1898; not collected since).

MEXICO. Chiapas: *Matuda* 17229, NY (1947). Colima: *McVaugh* 24970, LL (1970). Guerrero: *Hinton* 10969, LL (1937). México: *Hinton* 5362, NY (1933). Michoacán: *Hinton* 7581, LL (1935). Quintana Roo: *Lewis* 6378 (1967). Tabasco: *Cowan* 1758, TEX (1978). Veracruz: *Orcutt* 3129, MO (1910). Yucatán: *Millsbaugh* 185, F (1895).



## CENTRAL AMERICA

GUATEMALA. Escuintla: *Standley 64086*, F (1939). Izabal: *Ortiz 3555*, F (1908). Jutiapa: *Standley 75028*, F (1940). Quezaltenango: *Croat 32775*, MO (1976). Retalhuleu: *Molina 26967*, F (1907). Santa Rosa: *Standley 37907*, F (1892).

BELIZE. *Gentle 108*, F (1933).

EL SALVADOR. Morazán: *Tucker 493*, F, NY (1941).

HONDURAS. Choluteca: *Standley 27758*, F (1949). El Paraiso: *Standley 16536*, F (1949). Islas de la Bahía: *Molina 20742*, F (1967). Morazán: *Standley 11658*, F (1947). Ocotepeque: *Molina 22540*, F (1968). Yoro: *Standley 53920*, F (1927).

NICARAGUA. Boaco: *Stevens 14571*, NY (1979). Chinandega: *Grijalva 537*, F (1979). Estelí: *Nelson 7704*, NY (1968). Granada: *Sandino 1281*, F (1981). Jinotega: *Stevens 15434*, MO, NY (1979). Managua: *Stevens 3431*, F (1969). Masaya: *Stevens 4244*, F (1977). Nuevo Segovia: *Moreno 13623*, MO (1981). Río San Juan: *Sandino 1744*, F, NY (1981). Zelaya: *Ipoly 3546*, MO (1979).

COSTA RICA. Heredia: *Hammel 7883*, MO (1980). Limón: *Davidson 6908*, MO (1978). Puntarenas: *Kernan 53* (1988).

PANAMA. Bocas del Toro: *Dunlap 314*, F (1924). Chiriquí: *Croat 21922*, MO (1973). Coclé: *Rodriguez 1173*, MO (1947). Darién: *Duke 4143*, MO (1961). Herrera: *Tyson 3136*, MO (1966). Los Santos: *Burch 1265*, MO (1966). Panamá: *Macbride 2795*, F (1923). San Blas: *Croat 16964*, MO (1971). Veraguas: *Tyson 5170*, MO (1968). W/O Locality: "Colón" *O. Kuntze s.n.*, NY (1841).

## WEST INDIES

BAHAMA ISLANDS. Abaco: *Brace 1959*, NY (1904). Crooked Island: *Brace 1906*, F, NY (1906). Eleuthra: *Correll 48937*, NY (1977). Great Exuma: *Correll 44089*, NY (1975). New Providence: *Hitchcock s.n.*, F (1890).

GREATER ANTILLES: CUBA. Camaguey: *Shafer 120*, NY (1909); Havana: *Rugel 1849*, NY (1849); Matanzas: *Brutton 370*, NY (1903). Oriente: *Shafer 1581*, F, NY (1909); Pinar del Río: *Alain 425*, NY (1943); Santa Clara: *Combs 478*, F, NY (1895); Cuba: *Wright s.n.*, NY (1856-57). DOMINICAN REPUBLIC. *Taylor 764*, F, NY (1909). GRAND CAYMAN. *Armour 1276*, F (1859). HAITI. *Nash 1037*, NY (1905). JAMAICA. *Lloyd 1121*, F, MO (1890). PUERTO RICO. *Garber 27*, NY (1880). TRINIDAD. *Skousted 33*, MO (1935). VIRGIN ISLANDS. *Acevedo 1888*, NY (1987); *D'Arcy 5106*, MO (1971); Saint Croix, *Ricksecker 31*, F, NY (1895); Saint Thomas, *Kuntze 102*, NY (1874).

LESSER ANTILLES: ANTIGUA. *Box* 936, F (1937). BARBADOS. *Bovell* 380 (1901). DOMINICA. *Lloyd* 465, NY (1903). GRENADA. *Broadway s.n.*, MO (1904); w/o data, F (1904). GUADELOUPE. *Duss* 2496, NY (1902). MARTINIQUE. *Hahn* 390, NY (1871). MONTSERRAT. *Shafer* 27, F, NY (1907). SAINT BARTHELEMY *Forsstrom* 7227, F (w/o date). SAINT KITTS. *Britton* 136, NY (1901). SAINT VINCINT. *Smith* 723, NY (w/o date). TOBAGO: *Eggers* 5527, NY (1889). CURAÇAO. *Boldingh s.n.*, NY (1913).

### SOUTH AMERICA

BOLIVIA. *Gentry* 44241, MO (1984). Beni: *Solomon* 6273, MO, NY (1981). Nor-Yungas: *Solomon* 7372, F, MO, NY (1982). Pando: *Nee* 31596, MO, NY (1980).

COLOMBIA. Bolívar: *Killip* 14286, NY (1926). Caldas: *Cuatrecasas* 23104, F (1946). Chocó: *Gentry* 17257, MO (1976). Cundinamarca: *King* 5888, F, NY (1965). Los Llanos: *Cuatrecasas* 1975, F (1938). Magdalena: *Andre s.n.*, F (1875). Norte de Santander: *Fabrega* 850, F (1944). Tolima: *Pennell* 3376, MO (1917). Valle: *Cuatrecasas* 22596, F (1946).

ECUADOR. Chimborazo: *Camp E-3043*, NY (1945). El Oro: *Daly* 114, NY (1978). Esmeraldas: *Asplund* 16443, NY (1955). Galapagos Islands: *Snow* 346, NY (1963). Guayas: *Mille* 1006, F (1937). Los Rios: *Dodson* 7051, F, MO (1978). Morona-Santiago: *Brandbyge* 32238, NY (1980). Napo: *Bowbray* 69927, MO (1969). Pichincha: *Harling* 9288, F, MO, NY (1968). w/o locality: *Andre* 483, NY (1975).

PERU. Junín: *Woytkowski* 7362, MO (1962). Loreto: *Croat* 17989, MO (1972). Ucayali: *MacRae* 15, F (1981).

VENEZUELA. Aragua: *Pittier* 148, MO (1927). Bolívar: *Boom* 6271, MO (1985). Delta Amacuro: *Steyermack* 115217, MO (1977). Fed. Distr.: *Bailey* 206, MO (1921). Guarico: *Davidse* 4189, MO (1976). Isla Margarita: *Miller* 131, F, MO (1901). Miranda: *Croat* 21685, MO (1973). Monagas: *Trujillo* 9467, F (1969). Portuguesa: *Smith* 892, MO (1982). Sucre: *Fernández* 3751, NY (1980). Tachira: *Croat* 54960, MO (1982). Zulia: *Bunting* 11339, NY (1982).

BRITISH GUIANA. *Persand* 150, F (1923).

FRENCH GUIANA. *Feuillet* 1695, F, MO (1985).

SURINAM. *Coulen* 331, MO (1841).

BRAZIL. Bahia: *Chase* 7879, MO (1924). Ceara: *Drovet* 2234, F (1935). Minas Geraes: *Chase* 9261, MO (1925). Para: *Dahlgren* 451, F (1929). Pernambuco: *Pickel* 19, F (1930). w/o locality: *Rusby* 233, F, MO (1895).

## ASIA

- AMBOINA. *Robinson* 1835, NY (1913).  
BANGLADESH. *Khan* 4312, MO (1976).  
CELEBES. *Kauderns* 258, NY (1917).  
CEYLON. *Millspaugh* 2498, F (1912).  
CHINA. Hainan: *Chow* 78475, MO, NY (1978). Kwong Tung: *Levine* 1899, MO (1917).  
HONG KONG. *Millspaugh* 2735, F (1911).  
INDIA. Madras, *Pres. Madras Coll. s.n.*, NY (1929).  
JAPAN. *Iwatsuki* 682, MO (1976).  
MALAYSIA. *Elmer* 20709, MO (1922).  
PHILIPPINES. *Merrill* 36, NY (1902).  
SINGAPORE. w/o collector, MO (1904).  
SUMATRA. *Toroes* 3649, NY (1933).  
TAIWAN. *Gressitt* 485, NY (1934).  
THAILAND. *King* 5562, F (1963).  
VIETNAM. *Squires* 28, NY (1927).

## AFRICA

- BURUNDI. *Lambinon* 78/133, MO (1978).  
CAMEROON. *Gandoger s.n.*, MO (1906).  
GAMBIER. *Chapin* 935, NY (1934).  
GHANA. *Enti* 69, NY (1971).  
HAUTE-VOLTA. *Georges* 15403, MO (1958).  
IVORY COAST. *Amshoff* 637, MO (1972).  
KENYA. *Robertson* 3319, MO (1982).  
KIVU. *Alcool* 8961, MO (1958).  
LIBERIA. *Baldwin* 6949, MO (1947).  
MALAWI. *Pawek* 8267, MO (1974).  
NIGERIA. *Ekwuno* 63767, MO (1971).  
REP. CENTRAFRICAINE. *Leeuwenberg* 6252, MO (1965).  
S. TOME. *Viegas s.n.*, NY (1948).  
SENEGAL. *Georges* 582, MO (1948).  
SIERRA LEONE. *Thomas* 2955, MO (1914).  
TANZANIA. *Tanner* 1917, NY (1955).  
UGANDA. *Dummer* 3264, MO (1917).  
ZAIRE. *Louis* 11542, NY (1938).  
PACIFIC ISLANDS: CAROLINES. *Carr* 11093, NY (1935). COOK. *Yuncker* 9867, NY (1940). ELLICE. *Chambers* 46, MO (1974). FIJI. *Degen* 13518, F (1940). FRENCH POLYNESIA. *Florence* 1982, NY (1952).

MARIANAS. *Kanehira* 2215, NY (1933). MARQUESAS. *Chapin* 762, NY (1934). NEW CALEDONIA. *Baumann-B.* 13744, NY (1951). SAMOA. *Vaupe* 2, MO (1905). SEYCHELLES. *Jeffrey* 437, NY (1961). SOCIETY. *Moore* 36, MO (1926). SOLOMON. *Riley* 23, NY (1945). TONGA. *Hurlimann* 522, NY (1926).

### EXCLUDED NAMES

*Synedrella peduncularis* Benth., *Pl. Hartw.* 119. 1843. Blake (1916, in Hook. Ic. Pl. t. 3058) correctly positioned this name in the genus *Schizoptera*, *S. peduncularis* (Turez.) S.F. Blake, where it replaced the later name *S. trichotoma* Turez. (1851).

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